

Remarks

Please amend claims 21, 22, 25 and 29 and add new claims 32-40 as indicated above.

Please cancel the present abstract and substitute therefore the new abstract set forth above. The Examiner will note that the new abstract closely follows amended claim 21.

In the official action the Examiner objects to the length of the abstract on page 2 of the official action. As the Examiner is no doubt aware, this application's parent application was filed long before the 150-word length limitation came into effect. Nevertheless, the Applicant submits herewith a new abstract which is patterned after claim 21 (as amended) and which includes fewer than 150 words. It is hopeful that the cancellation of the old abstract and the adoption of this new abstract that this grounds for objection will fall away.

Please amend the paragraph bridging pages 15 and 16 of the application as filed as indicated above. The specification amendment is a marked version of the paragraph showing the change which was made, which is simple to put the word "FILM" into lower case characters.

In claims 21, 25 the word "thin" has been deleted and the references to "a", "the" or "said" metal have also been deleted.

On page 3 of the official action the Examiner objects to claims 23 and 29. With respect to claim 29 that claim has been amended to be dependent upon claim 28 to thereby provide the antecedents for the terms for which the Examiner objected.

With respect to claim 23, the claim has not been amended. The Examiner asserts that the periodic table does not contain periods III, IV and V. With all due respect to the Examiner, the Examiner's assertion is not quite correct and, moreover, does not reflect the confusing nature of the periodic table. Enclosed herewith are three different

versions of the periodic table which were recently found on the Internet.

First, look at the periodic table from www.chemlab.pc.maricopa.edu. The Examiner will note that it certainly shows groups III, IV and V. Now compare the periodic table from www.periodictable.tsx.org with the periodic table from www.cs.ubc.ca. Look, in particular, for Gallium which occupies position 31 on the periodic table. According to one of these two periodic tables Gallium falls in group 3b but according to the other periodic table it falls in group 3a. A similar problem arises for Arsenic, element number 33. It is in group 5b according to one table but in group 5a according to another table.

It seems that the scientific world has not quite come to agreement on just how these groups should be identified in the periodic table. Perhaps the scientific world has just agreed to disagree. In any event, it is submitted that it would hardly be helpful to change claim 23 to add letter designations after the periods identified in that group.

Enclosed herewith is a copy of US Patent No. 6,387,793 which is a patent which issued on this application's parent application. Note claim 4 and the fact that the Examiner in charge of that application obviously had no problem with references to periods III, IV or V.

Next, the Examiner is requested to consider US Patent No. 6,571,028, a copy of which is also enclosed herewith. The Examiner is respectfully requested to note the other publications found on page 2 of that patent and particularly the articles by Arthur J. Nozik et al. and D. Bimberg et al. both of which use "III-V" in the titles of the articles. The Examiner will note that there are no lower case "a" or lower case "b" letters following the roman numerals. The reason is obvious in view of the lack of consensus in the scientific world as to just how the groups of elements are to be identified, as discussed above.

The Examiner is invited to do a search at the USPTO web site for "III-V". The Examiner will find that such nomenclature is even used in the title of a US patent.

The Examiner is respectfully requested to withdraw this grounds for objection. If the Examiner refuses to withdraw the objection, then the Applicant respectfully requests that the Examiner support his contentions with an Affidavit as required by 37 C.F.R. 1.104(d)(2).

The Examiner rejected claims 21-23 and 25-27 under 35 U.S.C. 102(b) as being anticipated by Mis et al. (US Patent No. 5,767,010).

As the Examiner will note by reference to the amendments made to the claims, claim 21 has been amended to more clearly differentiate it from the '010 patent. In particular, claim 21 now recites that the "underbump metallization" projects "from said substrate with an exposed sidewall" and that the metal referred to in claim 21 covers "the exposed sidewall of said multilayer underbump metallization."

This feature is shown in Figures 3 and 3a of the application as filed. See also the paragraph bridging pages 15 and 16 of the application as filed.

The Examiner rejected claims 28-31 under 35 U.S.C. (103) as being unpatentable over the '010 patent in view of Greer (US Patent No. 6,541,681). This grounds for rejection is respectfully traversed.

Claims 28-31 now appear, in a somewhat amended form, as claims 32-35.

Turning to the examiner's rationale for rejecting old claims 28-31, the Examiner asserts that it would be obvious to apply Greer's teachings of a sealant type titanium layer to Mis' solder bump structure. With all due respect to the Examiner, it is believed that the Examiner reads too much into the prior art.

What the Examiner appears to be asserting is that it would be somehow obvious to add a layer of titanium to Mis' underbump metallization in accordance with the teachings of Greer. First, the Examiner is invited to again review Figures 5 and 6 or 11 and 12 of Mis. As the Examiner will note, there is a layer identified by the numeral 28

immediately adjacent insulating film 26. Greer teaches a layer 504 which is immediately adjacent polyimide layer 502. The Examiner asserts that layer 504 is "made of titanium." The Examiner is respectfully requested to state for the record his basis for this statement, since the specification seems to state that layer 504 is "similar" to e.g. titanium (see column 5, lines 46 - 48).

Even assuming for the moment that sealant feature 504 of the '681 patent is made of titanium, why would a person of ordinary skill in the art insert a layer of titanium between Mis' layers 28 and 26? It is noted that Mis clearly identifies his layer 28 as being a layer of titanium. Why insert another layer of titanium? What is the motivation to do that?

It is noted that in the Examiner's rejection of claim 21, the Examiner makes reference to layer 28 of Mis reading upon the "thin layer" recited in claim 21. Of course, that limitation (without the word "thin") appears in claim 21 and also appears in claim 28 as well as in new claim 32. A sealant feature 7b is shown in Figures 3 and 3a of Applicant's application. The layer of metal is shown by reference numeral 7a. Note that the layer and the sealant feature both preferably extend beyond an edge or periphery of the underbump metallization 5. New claim 32 also recites that "the layer of metal and the sealant feature both extend outwardly beyond an edge or periphery of the multilayer underbump metallization." This feature also differentiates claim 32 from the art cited by the Examiner.

As the Examiner will note, three new claims, 36-38 have been added which depend either directly or indirectly from claim 32. Claim 36 recites that "the sealant feature is in contact with the layer of metal." Claims 37 and 38 recite that the sealant feature is ring or annular shaped as discussed at page 10 of the application as filed.

In summary, it is submitted that a person of ordinary skill in the art would not combine the teachings of the '010 patent with the '681 patent along the lines suggested by the Examiner.

The Examiner rejected claim 24 as being unpatentable over Mis in view of Kung (US Patent No. 6,179,200). This grounds for rejection is respectfully traversed.

The Examiner's rationale for combining the teachings of the '010 patent and the '200 patent is simply not understood.

First, Mis specifically teaches a multilayer underbump metallization comprising three layers, namely a chromium layer 30, a phased layer 32 of chromium and copper and a copper layer 34. Please see column 4, lines 17-27. The Examiner asserts that it would be obvious to a person of ordinary skill in the art to substitute titanium, nickel and gold for Mis' multilayer underbump metallization. The rationale which the Examiner puts forward for making this substitution is that it would be "within the general skill of a work in the art to select a known material on the basis of its suitability for the intended use as a matter of artist design choice".

With all due respect to the Examiner, a person of ordinary skill in the art would not do what the Examiner says. Mis clearly teaches that the underbump metallization 30, 32-34 are disposed upon a titanium barrier layer 28. So, if Mis' layer 28 is titanium, why make Mis' layer 30 also titanium based on the teaching of '200? The Examiner has not provided a rationale for a person of ordinary skill in the art to do that.

New claim 39 is added by the response. Claim 39 is also patterned after old claim 21, but the former thin layer now appears as "a plating membrane and non-wettable dam comprising a metal layer selected from a group consisting of chrome, a titanium-nickel-titanium composite, a titanium-nickel-chrome composite, a titanium-platinum-titanium composite, and a titanium-nickel-oxidized silicon composite deposited under and in contact with said multilayer underbump metallization and extending outwardly beyond a peripheral edge of said multilayer underbump metallization..." This limitation, which finds support in the embodiments of Figures 4 - 4(e), differentiates this claim from the cited art.

Reconsideration of this application as amended is respectfully requested.

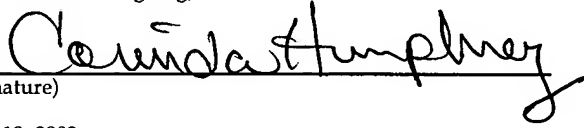
The Commissioner is authorized to charge any additional fees which may be required or credit overpayment to deposit account no. 12-0415. In particular, if this response is not timely filed, then the Commissioner is authorized to treat this response as including a petition to extend the time period pursuant to 37 CFR 1.136 (a) requesting an extension of time of the number of months necessary to make this response timely filed and the petition fee due in connection therewith may be charged to deposit account no. 12-0415.

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Corinda Humphrey

(Name of Person Signing)

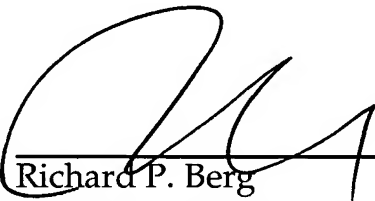


(Signature)

June 18, 2003

(Date)

Respectfully submitted,



Richard P. Berg

Attorney for Applicants

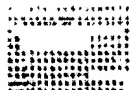
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The Pictorial Periodic Table

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I	II	IIIb	IVb	Vb	VIb	VIIb		VIIIb		Ib	IIb	III	IV	V	VI	VII	0
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
H													B	C	N	O	F
Li	Be												Al	Si	P	S	Cl
Na	Mg												Ga	Ge	As	Se	Br
K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn		In	Sn	Sb	Te	I
Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd		Hg	Pb	Bi	Po	At
Cs	Ba	La*	Hf	Ta	W	Re	Os	Ir	Pt	Au							
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Lanthanides *			Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu	
Actinides **			Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr	

Search the Pictorial Periodic Table:

Search for elements with the following properties:

10.0 > Density, g/mL > 12.0

Find the following keywords in the element descriptions:

gas

or liquid (not yet active)

and toxic (not yet active)

Graph the following property: Atomic Weight, u

for these elements: 1 to 112 .

Chart... the properties below for a list of elements: (not active now)

Element Name	Atomic Radius	Melting Point	Heat of Vaporization
Atomic Number	Covalent Radius	Boiling Point	Heat of Fusion
Atomic Weight	Density	Specific Heat	Electronegativity
Oxide Properties	Crystal Form	States	Ionization Potential

Periodic Table Tidbits:

Alternate styles for the Periodic Table:

<http://periodictable.tsx.org>

57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400	401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500	501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520	521	522	523	524	525	526	527	528	529	530	531	532	533	534	535	536	537	538	539	540	541	542	543	544	545	546	547	548	549	550	551	552	553	554	555	556	557	558	559	560	561	562	563	564	565	566	567	568	569	570	571	572	573	574	575	576	577	578	579	580	581	582	583	584	585	586	587	588	589	590	591	592	593	594	595	596	597	598	599	600	601	602	603	604	605	606	607	608	609	610	611	612	613	614	615	616	617	618	619	620	621	622	623	624	625	626	627	628	629	630	631	632	633	634	635	636	637	638	639	640	641	642	643	644	645	646	647	648	649	650	651	652	653	654	655	656	657	658	659	660	661	662	663	664	665	666	667	668	669	670	671	672	673	674	675	676	677	678	679	680	681	682	683	684	685	686	687	688	689	690	691	692	693	694	695	696	697	698	699	700	701	702	703	704	705	706	707	708	709	710	711	712	713	714	715	716	717	718	719	720	721	722	723	724	725	726	727	728	729	730	731	732	733	734	735	736	737	738	739	740	741	742	743	744	745	746	747	748	749	750	751	752	753	754	755	756	757	758	759	760	761	762	763	764	765	766	767	768	769	770	771	772	773	774	775	776	777	778	779	780	781	782	783	784	785	786	787	788	789	790	791	792	793	794	795	796	797	798	799	800	801	802	803	804	805	806	807	808	809	810	811	812	813	814	815	816	817	818	819	820	821	822	823	824	825	826	827	828	829	830	831	832	833	834	835	836	837	838	839	840	841	842	843	844	845	846	847	848	849	850	851	852	853	854	855	856	857	858	859	860	861	862	863	864	865	866	867	868	869	870	871	872	873	874	875	876	877	878	879	880	881	882	883	884	885	886	887	888	889	890	891	892	893	894	895	896	897	898	899	900	901	902	903	904	905	906	907	908	909	910	911	912	913	914	915	916	917	918	919	920	921	922	923	924	925	926	927	928	929	930	931	932	933	934	935	936	937	938	939	940	941	942	943	944	945	946	947	948	949	950	951	952	953	954	955	956	957	958	959	960	961	962	963	964	965	966	967	968	969	970	971	972	973	974	975	976	977	978	979	980	981	982	983	984	985	986	987	988	989	990	991	992	993	994	995	996	997	998	999	1000
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7 Actinoids

Periodic Table of the Elements

1a	2a	3b	4b	5b	6b	7b	8			1b	2b	3a	4a	5a	6a	7a	0
<u>H</u> <u>1</u>																	<u>He</u> <u>2</u>
<u>Li</u> <u>3</u>	<u>Be</u> <u>4</u>										<u>B</u> <u>5</u>	<u>C</u> <u>6</u>	<u>N</u> <u>7</u>	<u>O</u> <u>8</u>	<u>F</u> <u>9</u>	<u>Ne</u> <u>10</u>	
<u>Na</u> <u>11</u>	<u>Mg</u> <u>12</u>										<u>Al</u> <u>13</u>	<u>Si</u> <u>14</u>	<u>P</u> <u>15</u>	<u>S</u> <u>16</u>	<u>Cl</u> <u>17</u>	<u>Ar</u> <u>18</u>	
<u>K</u> <u>19</u>	<u>Ca</u> <u>20</u>	<u>Sc</u> <u>21</u>	<u>Ti</u> <u>22</u>	<u>V</u> <u>23</u>	<u>Cr</u> <u>24</u>	<u>Mn</u> <u>25</u>	<u>Fe</u> <u>26</u>	<u>Co</u> <u>27</u>	<u>Ni</u> <u>28</u>	<u>Cu</u> <u>29</u>	<u>Zn</u> <u>30</u>	<u>Ga</u> <u>31</u>	<u>Ge</u> <u>32</u>	<u>As</u> <u>33</u>	<u>Se</u> <u>34</u>	<u>Br</u> <u>35</u>	<u>Kr</u> <u>36</u>
<u>Rb</u> <u>37</u>	<u>Sr</u> <u>38</u>	<u>Y</u> <u>39</u>	<u>Zr</u> <u>40</u>	<u>Nb</u> <u>41</u>	<u>Mo</u> <u>42</u>	<u>Tc</u> <u>43</u>	<u>Ru</u> <u>44</u>	<u>Rh</u> <u>45</u>	<u>Pd</u> <u>46</u>	<u>Ag</u> <u>47</u>	<u>Cd</u> <u>48</u>	<u>In</u> <u>49</u>	<u>Sn</u> <u>50</u>	<u>Sb</u> <u>51</u>	<u>Te</u> <u>52</u>	<u>I</u> <u>53</u>	<u>Xe</u> <u>54</u>
<u>Cs</u> <u>55</u>	<u>Ba</u> <u>56</u>	<u>La</u> <u>57</u>	<u>Hf</u> <u>72</u>	<u>Ta</u> <u>73</u>	<u>W</u> <u>74</u>	<u>Re</u> <u>75</u>	<u>Os</u> <u>76</u>	<u>Ir</u> <u>77</u>	<u>Pt</u> <u>78</u>	<u>Au</u> <u>79</u>	<u>Hg</u> <u>80</u>	<u>Tl</u> <u>81</u>	<u>Pb</u> <u>82</u>	<u>Bi</u> <u>83</u>	<u>Po</u> <u>84</u>	<u>At</u> <u>85</u>	<u>Rn</u> <u>86</u>
<u>Fr</u> <u>87</u>	<u>Ra</u> <u>88</u>	<u>Ac</u> <u>89</u>	<u>Rf</u> <u>104</u>	<u>Ha</u> <u>105</u>	?? 106												
Lanthinide Series	<u>Ce</u> <u>58</u>	<u>Pr</u> <u>59</u>	<u>Nd</u> <u>60</u>	<u>Pm</u> <u>61</u>	<u>Sm</u> <u>62</u>	<u>Eu</u> <u>63</u>	<u>Gd</u> <u>64</u>	<u>Tb</u> <u>65</u>	<u>Dy</u> <u>66</u>	<u>Ho</u> <u>67</u>	<u>Er</u> <u>68</u>	<u>Tm</u> <u>69</u>	<u>Yb</u> <u>70</u>	<u>Lu</u> <u>71</u>			
Actinide Series	<u>Th</u> <u>90</u>	<u>Pa</u> <u>91</u>	<u>U</u> <u>92</u>	<u>Np</u> <u>93</u>	<u>Pu</u> <u>94</u>	<u>Am</u> <u>95</u>	<u>Cm</u> <u>96</u>	<u>Bk</u> <u>97</u>	<u>Cf</u> <u>98</u>	<u>Es</u> <u>99</u>	<u>Fm</u> <u>100</u>	<u>Md</u> <u>101</u>	<u>No</u> <u>102</u>	<u>Lr</u> <u>103</u>			

List by atomic number. List by name. List by symbol.

Go back to the elements page.